Caucasiana **2**, 2023, 161–164 | DOI 10.3897/caucasiana.2.e107920 Ilia State University, Tbilisi

CAUCASIANA
Journal on the biodiversity of the Caucasus and the adjacent regions

The first record of *Haploembia solieri* (Rambur, 1842) (Insecta, Embioptera) in Georgia

Armen Seropian[1], Natalia Bulbulashvili[2], Aleqsandre Zukakishvili[1]

1 *Institute of Ecology, Ilia State University, Cholokashvili av. 3/5 Tbilisi, 0162, Georgia*

2 *Rustaveli st. 8, 1400, Gori, Georgia*

http://zoobank.org/989BD48A-4CB3-4FA1-A176-FA478E65A1E9

Corresponding author: Armen Seropian (armen.seropiani@iliauni.edu.ge)

Academic editor: Dávid Murányi ♦ **Received:** 13 June 2023 ♦ **Accepted:** 13 August 2023 ♦ **Published:** 12 September 2023

Abstract

The first representative of the footspinners - *Haploembia solieri* (Rambur, 1842) (Insecta, Embioptera, Oligotomidae), is reported from Georgia for the first time. Notes on the species distribution and ecology are also provided, along with a map of collecting sites, photos of a live specimen, and diagnostic drawings.

Key words

CaBOL, faunistics, footspinners, new record, Oligotomidae, South Caucasus, webspinners

Introduction

The footspinners, also known as webspinners, form the order Lameere, 1900, with more than 400 described species worldwide combined in 11 families (Maehr et al. 2023). The name "footspinners" indicates the ability of these insects to spin silk via glands located in their specialized swollen protarsi. The silk itself is used to form so-called galleries on and under tree trunks, rocks, soil, and other substrates (Ross 2000). Inside these tunnel-like structures, these insects move with equal ease both forward and backward. The most widely accepted consensus currently suggests that Phasmida and Embioptera are sister groups of Embioptera (Wipfler et al. 2019).

Around a dozen species of footspinners are found in southern Europe in the families Embiidae and Oligotomidae (Ross 1966), of which only two species, namely *Haploembia solieri* (Rambur, 1842) and *Embia tartara* Saussure, 1896, are known to occur in the post-Soviet countries territories (Jacobson and Bianki 1905; Krauss 1911; Rimsky-Korsakov 1948; Bey-Bienko 1964; Ross 2000; Temreshev 2015, 2023). Previously, no species of Embioptera were recorded from Georgia, and we report *Haploembia solieri* for the first time.

Materials and methods

The material for the present study was collected in two consecutive years – in 2022 during an expedition to Vashlovani National Park organized within the Caucasus Barcode of Life (CaBOL- https://ggbc.eu/), and in 2023 during a one-day individual trip to Shulaveri (Fig. 1), which was more of a reconnaissance nature. The specimens were collected during the day from the leaf litter via an entomological soil sifter and by hand from silk galleries in soil crevices under the rocks, then preserved in 96% ethanol and deposited in the collection of ISU for further genetic studies. For specific identity, we used the keys by Rimsky-Korsakov (1948), Bey-Bienko (1964), Ross (1966), Murányi and Kovács (2014), and Kelly et al. (2018).

Photos of the live specimens (Fig. 2A) were taken using a Canon EOS 550D camera with a Canon EF 60 mm f/2.8 Macro USM lens and a Canon Macro Twin Lite MT-26EX-RT. Digital images were prepared using Zerene Stacker image stacking software and Adobe Photoshop CS6 (version 13.0). Diagnostic drawings were made based on microscope photographs and using a Wacom CTH-690 Intuos Medium Pen and Touch Tablet with the programs Krita (version 2.9.7) and Photoshop CS6 (version 13.0)

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Figure 1. Map of the sampling sites of *Haploembia solieri* (Rambur, 1842). Inserts are taken from Google Maps and show the habitat at the sampling sites.

Results

Family Oligotomidae Enderlein, 1909

Haploembia solieri (Rambur, 1842)

Fig. 2

=*Embia taurica* Kusnezov, 1903

Material examined. GEORGIA • 1♀; Mijniskure (Vashlovani National Park); N41.1113°, E46.6455°; 95 m a.s.l.; in leaf litter near the Alazani River; leg. N. Bulbulashvili; 15. April 2022; CaBOL-ID 1023351 • 3♀♀; Shulaveri (Qvemo Qartli region); N41.3681°, E44.8219°; 479 m a.s.l.; in soil cracks under rocks in steppe on a hill covered with Paliurus spina-christi; leg. N. Bulbulashvili, A. Zukakishvili, A. Seropian; 03. June 2023; CaBOL-IDs 1035535, 1035536, 1035537.

Discussion

The newly recorded *Haploembia solieri* is readily distinguished from other European species by the presence of two instead of one ventral papillae on the hind basitarsus (Fig. 2B), a pale prothorax (Fig. 2C), mandibles uncarinated and only slightly elevated basolaterally. The males are apterous (Ross 1966) and are distinguished from females by the presence of sclerotization in the genital region. Within the recent integrative study conducted by Kelly et al. (2018), the long-thought parthenogenetic population of *H. solieri* was recognized as a different species – *H. tarsalis* (Ross, 1940), based not only on the external differences (such as contrast coloration between the venter and dorsum of the abdomen), but also on levels of social behavior (asexual species display antisocial behavior) and differences in the number of chromosomes. According to this, the populations from the adjacent Abrau Peninsula (Gilyarov and Arnoldi 1958; Gongalsky et al. 2006), previously considered a parthenogenetic form of *H. solieri*, either belong to the second of the above-mentioned species or in fact represent the sexual form (the absence of males in collections is not direct evidence of the population being asexual, especially given the fact that most males die shortly after mating and are rarely found in the field), with the same referring to other country reports on finds of an asexual form of *H. solieri*. From neighboring countries, this species is known to occur in Azerbaijan (Samedov 1996; Guseinov 2006; Shelton 2010), where it's said to be not that rare in Sheki-Zaqatala and Mingachevir, and Turkey (Ross 1966), while the southern coast of the Crimean Peninsula is considered to be its northernmost range limit (Kuznetsov 1904).

Despite the fact that we also didn't succeed with male specimens, the presence of several individuals under a single rock and the overall coloration of our specimens prove their identity.

Our finding may additionally indicate the presence and future finds in Georgia of *Rossimyiops longicornis* (Kugler, 1972), the tachinid fly associated with *H. solieri* (Badano et al. 2022).

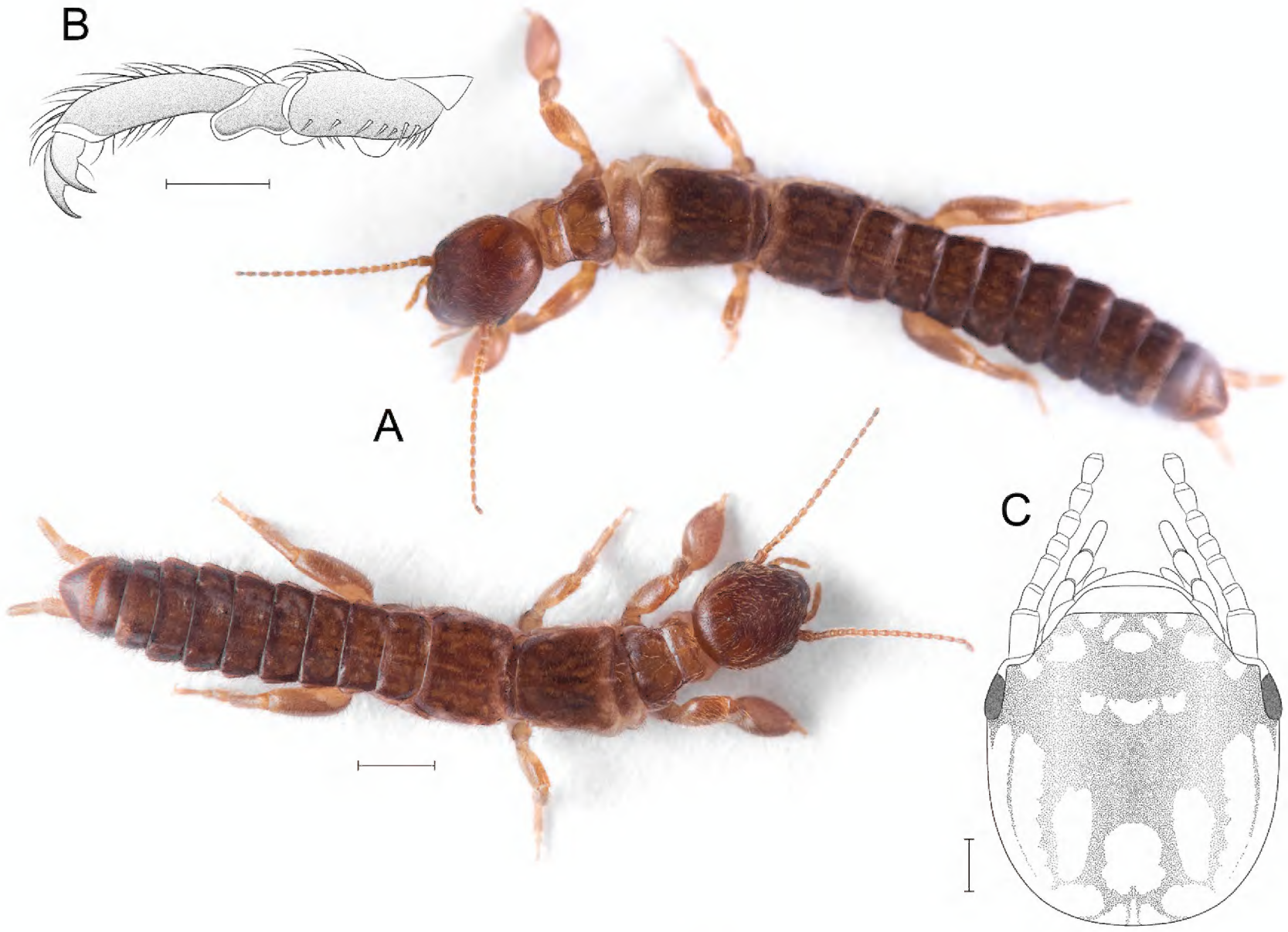

Figure 2. *Haploembia solieri* (Rambur, 1842), female. **A**: live specimens from Shulaveri; **B**: hind leg basitarsus, lateral view; **C**: pattern of head and prothorax, dorsal view. Scale bars: 1 mm (A); 0.2 mm (B, C).

Acknowledgements

Our deepest gratitude to our friend and colleague Giorgi Iankoshvili for his help with preparing the map of the sampling sites and to our faithful driver David Kandelaki, who from the very beginning of the project boldly led us on expeditions that ended in success and many discoveries throughout Georgia. We are indebted to Natalya Snegovaya for her assistance in finding the missing literature. Much obliged to David Muranyi and the anonymous reviewer who helped to significantly improve the quality of our manuscript.

The project on which this study is based was funded by the Federal Ministry of Education and Research under grant 01DK20014A. Our special thanks to the Agency of Protected Areas for the collection permit #655-0-2-202103182033.

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